

X-Ray Pulsar Based Navigation and Time Determination, Phase II

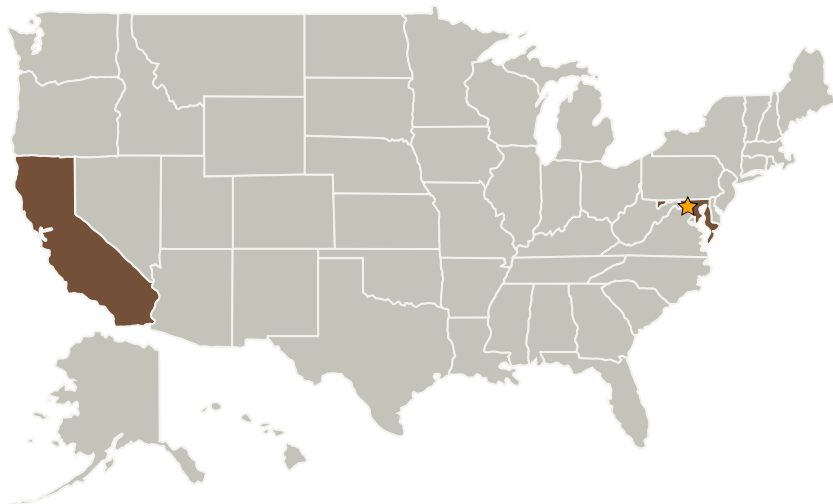
Completed Technology Project (2007 - 2009)



Project Introduction

Microcosm will build on the Phase I X-ray pulsar-based navigation and timing (XNAV) feasibility assessment to develop a detailed XNAV simulation capability to evaluate navigation performance for specific missions of interest, and create an XNAV flight software experiment ready to integrate on an appropriate near-term flight demonstration mission in Phase III. Phase I demonstrated achievable XNAV accuracy, developed a preliminary source catalog, constructed an XNAV error budget, and laid out potential implementation options for XNAV, focusing on an Earth-Sun L2 Lagrange point mission. Brighter, less stable, non-traditional X-ray sources were also considered for possible XNAV application with promising initial results, especially for formation flying applications. Taking advantage of concurrent XNAV efforts at DARPA to the maximum extent possible, Phase II will develop and validate XNAV algorithms via a simulation which will be targeted for integration with Goddard Space Flight Center's GPS Enhanced Onboard Navigation System (GEONS) software. The error budget will be developed in more detail to support the algorithm and simulation work. XNAV holds great potential for NASA as an enabling technology for fully autonomous interplanetary navigation and could provide a significant mission enhancement as an adjunct to the Deep Space Network (DSN) and ground based navigation.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Microcosm, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Hawthorne, California

Primary U.S. Work Locations

California	Maryland
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.4 Network Provided Position, Navigation, and Timing
 - └ TX05.4.2 Revolutionary Position, Navigation, and Timing Technologies